U.S. Department of the Interior U.S. Geological Survey

METAL INDUSTRY INDICATORS

September 1997

Indicators of Domestic Primary Metals, Steel, Aluminum, and Copper Activity

The primary metals leading index continued to increase in August. With the exception of the index for copper, the other metal industry leading indexes were also higher in July, the latest month for which they are available. Taken together, these indexes suggest that the overall primary metals industry will continue to grow in the coming months.

The **primary metals leading index** rose 1.5% in August, to 127.6 from a revised 125.7 in July. The August increase marks the eleventh consecutive monthly increase for this index. The index's 6-month smoothed growth rate, a compound annual rate that measures the near-term trend, advanced to 8.0% in August from a revised 5.9% in July.

An increase of 0.7 hour in the length of the average workweek in primary metals establishments accounted for most of the increase in the leading index. Moreover, the August workweek of 45.1 hours matches the longest workweek in the 50-year period that these data have been collected and points to increasing strength in U.S. manufacturing. Gains in the S&P stock price index for diversified machinery and the growth rate of the Journal of Commerce metals price index also pushed the leading index higher. The fourth available component, the Purchasing Managers' Index, declined in August. The August primary metals leading index, which should be considered preliminary because only four of eight components were available, continues to signal growth in the U.S. primary metals industry during the coming months.

The **steel leading index** edged up 0.1% in July to 105.0 from 104.9 in June. The indicators that made the largest positive contributions to the index were the Purchasing Managers' Index and the S&P stock price index for steel companies, while the indicators that made the largest negative contributions were the industrial production index for automotive products and the deflated value of shipments of household appliances. July appliance shipments, however, were second in volume only to the record level reached in June. The 6-month smoothed growth rate of the steel leading index remains at its highest level in over 3 years. However, the domestic steel industry will probably continue to see modest growth in the months ahead because of capacity constraints and increasing imports.

The **aluminum mill products leading index** advanced 0.5% in July to 144.8 from a revised 144.1 in June, and the index's 6-month smoothed growth rate moved up to 4.4% from a revised 4.0% in June. The component for commercial and industrial construction contracts made the largest contribution to the July index increase, as that indicator reached its highest level since September 1989. This leading index points to moderate growth in the U.S. aluminum mill products industry in the coming months.

The **primary and secondary aluminum leading index** also increased in July, up 0.7% to 241.5 from a revised 239.8 in June. The 6-month smoothed growth rate of the primary and secondary aluminum index, which was 7.8% in July, continues to signal strong growth in the use of primary and secondary aluminum. Much of that demand will be satisfied by imports, so U.S. primary and secondary aluminum activity will probably grow only modestly. This has been the pattern over the past year, according to figures in the July Mineral Industry Surveys (MIS) for Aluminum published by the U.S. Geological Survey. From the last half of 1996 to the first half of 1997, primary and secondary aluminum production in the United States increased at an annual rate of 6.0%, while imports of imports of crude aluminum and alloys increased 33.0%. (Tables and charts for the primary and secondary aluminum indexes are in a separate file.)

The **copper leading index** fell 1.0% in July to 121.7 from a revised 122.9 in June. The index's 6-month smoothed growth rate slipped to 1.4%, the lowest rate since last September. Three of the index's six components, the ratio of shipments to inventories for electronic and other electrical equipment, the growth rate of the LME spot price of primary copper, and average weekly overtime hours worked in copper rolling and drawing mills, experienced relatively large declines that rank in the bottom ten percent of all month-to-month

changes for those components. The behavior of the copper leading index during the past few months and capacity constraints in the primary copper smelting and refining sector point to slow growth for domestic copper processing in the near term.

New Orders Boost Metals Price Leading Index

A strong gain in the component for deflated new orders for U.S. nonferrous metals in July spurred the leading index of metal prices to its largest increase since last January. The leading index increased 0.7% to 96.5, which is near its recent high of 96.6 in March. The index's 6-month smoothed growth rate also moved higher, up to 1.8% from a revised 0.5% in June. The other two index components that were available for July offset each other, with a small gain in building permits for new housing units balancing a decrease in the growth rate of the deflated M2 money supply. The fourth index component, the growth rate of the Organization for Economic Cooperation and Development total leading index, was not available for the July index calculation, but this index posted modest increases in May and June.

Another indicator of metal price trends, the growth rate of the deflated value of nonferrous metal products inventories held in the United States increased in July to 2.4% from a revised -4.4% in June.

It is too early to tell if the July increase in the leading index is signaling future increases in metal prices, especially in light of higher inventories and the slow overall growth in the industrialized countries. Most metal prices will probably experience little or no growth in the short term. It is important to recognize that the business cycle and inventories are only two factors in price determination. Other factors that affect prices include changes in metals production, speculation, strategic stockpiling, and production costs.

An explanation of the indexes and the 6-month smoothed growth rates appears on page 12.

Table 1.
Leading Index of Metal Prices and Growth Rates of the Nonferrous Metals Price Index, Inventories of Nonferrous Metal Products, and Selected Metal Prices

		Six-Month Smoothed Growth Rates				
	Leading Index of Metal Prices (1967=100)	MII Nonferrous Metals Price Index	U.S. Nonferrous Metal Products Inventories (1982$)	Primary Aluminum	Primary Copper	Steel Scrap
1996						
July	95.2	-24.1	11.0	-16.6	-39.9	-7.6
August	95.3	-20.9	10.6	-15.6	-33.3	-5.8
September	94.6	-26.8	10.9	-23.5	-37.6	-1.3
October	94.6	-21.1	9.2	-16.6	-31.7	-13.3
November	94.9r	2.1	6.3	-2.8	11.8	-26.3
December	95.0	-6.9	5.3	-2.0	-11.2	-21.8
1997						
January	95.9	6.4	-0.2	9.8	6.6	-6.6
February	96.5	11.0	-0.9	12.7	10.5	3.7
March	96.6	10.4	-3.7r	10.1	11.2	-3.3
April	96.3r	9.7	-3.6	10.8	12.2	-8.5
May	95.9r	18.3	-4.9	11.0	30.7	2.0
June	95.8r	15.1	-4.4r	5.1	25.8	3.4
July	96.5	16.1	2.4	21.0	3.4	11.6
August	NA	4.7	NA	4.6	-12.5	13.6

r *- Revised*

Note: The components of the Leading Index of Metal Prices are the 6-month smoothed growth rates of the following: 1, the deflated value of new orders for nonferrous metals; 2, the OECD leading index, total; 3, the index of new private housing units authorized; and 4, the deflated value of U.S. M2 money supply. The Metal Industry Indicators (MII) Nonferrous Metals Price Index measures changes in end-of-the-month prices for primary aluminum, copper, lead, and zinc traded on the London Metal Exchange (LME). The steel scrap price used is the price of No. 1 heavy melting. Inventories consist of the deflated value of finished goods, work in progress, and raw materials for U.S.-produced nonferrous metals and nonferrous metal products. Six-month smoothed growth rates are based on the ratio of the current month's index or price to its average over the preceding 12 months, expressed at a compound annual rate.

Sources: U.S. Geological Survey (USGS); American Metal Market (AMM); the London Metal Exchange (LME); the Bureau of the Census; and the Organization for Economic Cooperation and Development (OECD).

Link To:

Chart 1.

Table 2.
The Primary Metals Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
1996				
September	119.6r	1.3	108.3	3.8
October	119.9	1.5	109.0	4.5
November	120.2	1.7	108.7	3.4
December	121.3	3.1	109.0	3.5
1997				
January	121.4	2.9	109.1	3.0
February	122.6r	4.2	109.7	3.5
March	123.7	5.3	109.9	3.3
April	124.1	5.4	110.5	3.8
May	125.3	6.7	110.4	3.1
June	125.4	6.2	110.7r	3.1r
July	125.7r	5.9r	110.7	2.6
August	127.6	8.0	NA	NA

r *- Revised*

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

Table 3.
The Contribution of Each Primary Metals Index Component to the Percent Change in the Index from the Previous Month

Leading Index	**July**	**August**
1. Average weekly hours, primary metals (SIC 33)	-0.3r	1.4
2. S&P stock price index, machinery, diversified	0.4r	0.4
3. Ratio of price to unit labor cost (SIC 33)	-0.2	NA
4. JOC metals price index growth rate	0.0r	0.1
5. New orders, primary metals, (SIC 33) 1982$	0.0	NA
6. Index of new private housing units authorized by permit	0.0	NA
7. Growth rate of U.S. M2 money supply, 1992$	0.0	NA
8. Purchasing Managers' Index	0.3r	-0.4
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	0.2r	1.5

Coincident Index	**June**	**July**
1. Industrial production index, primary metals (SIC 33)	-0.1	-0.1
2. Total employee hours, primary metals (SIC 33)	0.0	-0.3
3. Value of shipments, primary metals, (SIC 33) 1982$	0.2r	0.3
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	0.2r	0.0

Sources: Leading: 1, Bureau of Labor Statistics; 2, Standard & Poor's; 3, Center for International Business Cycle Research, Bureau of Labor Statistics, and Federal Reserve Board; 4, Journal of Commerce; 5, Bureau of the Census and U.S. Geological Survey; 6, Bureau of the Census and U.S. Geological Survey; 7, Federal Reserve Board, Conference Board, and U.S. Geological Survey; and 8, National Association of Purchasing Management. Coincident: 1, Federal Reserve Board; 2, Bureau of Labor Statistics and U.S. Geological Survey; 3, Bureau of the Census and U.S. Geological Survey. All series are seasonally adjusted, except 2, 3, and 4 of the leading index.

NA*: Not available* ***r*** *- Revised*

Note: A component's contribution, shown in Tables 3, 5, 7, and 9, measures its effect, in percentage points, on the percent change in the index. Each month, the sum of the contributions plus the trend adjustment equals (except for rounding differences) the index's percent change from the previous month.

Links To:

Chart 2.

Chart 3.

Table 4.
The Steel Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
1996				
August	102.0	-1.2	98.5	1.7
September	101.9	-1.3	98.6	1.6
October	101.3	-2.2	98.9	2.0
November	102.0	-0.9	98.2	0.3
December	102.8	0.5	98.7	1.1
1997				
January	103.2r	1.1	99.3	2.1
February	103.9	2.4	99.0	1.2
March	104.4	3.2	99.2r	1.4
April	104.1r	2.4	99.7	1.9
May	104.2	2.4r	99.6	1.4
June	104.9	3.4	99.5	1.1
July	105.0	3.4	99.5	0.8

r *- Revised*

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

Table 5.
The Contribution of Each Steel Index Component to the Percent Change in the Index from the Previous Month

Leading Index	**June**	**July**
1. Average weekly hours, blast furnaces and basic steel products (SIC 331)	-0.1	-0.1
2. New orders, steel works, blast furnaces, and rolling and finishing mills, 1982$, (SIC 331)	0.1	0.0
3. Shipments of household appliances, 1982$	0.5	-0.2
4. S&P stock price index, steel companies	0.1	0.2
5. Industrial production index for automotive products	0.1	-0.3
6. Growth rate of the price of steel scrap (#1 heavy melting, $/ton)	0.0	0.1
7. Index of new private housing units authorized by permit	-0.1	0.0
8. Growth rate of U.S. M2 money supply, 1992$	0.0	0.0
9. Purchasing Managers' Index	-0.1	0.3
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	0.5	0.0
Coincident Index		
1. Industrial production index, basic steel and mill products (SIC 331)	-0.4	0.0
2. Value of shipments, steel works, blast furnaces, and rolling and finishing mills (SIC 331), 1982$	0.4	-0.1
3. Total employee hours, blast furnaces and basic steel products (SIC 331)	-0.1	-0.1
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	0.0	-0.1

Sources: Leading: 1, Bureau of Labor Statistics; 2, Bureau of the Census and U.S. Geological Survey; 3, Bureau of the Census and U.S. Geological Survey; 4, Standard & Poor's; 5, Federal Reserve Board; 6, Journal of Commerce and U.S. Geological Survey; 7, Bureau of the Census and U.S. Geological Survey; 8, Federal Reserve Board, Conference Board, and U.S. Geological Survey; and 9, National Association of Purchasing Management. Coincident: 1, Federal Reserve Board; 2, Bureau of the Census and U.S. Geological Survey; 3, Bureau of Labor Statistics and U.S. Geological Survey. All series are seasonally adjusted, except 4 and 6 of the leading index.

NA*: Not available* ***r*** *- Revised*

Links To:

Chart 4.

Chart 5.

Table 6.
The Aluminum Mill Products Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
1996				
August	139.0r	1.7r	124.2	3.0
September	140.5r	3.6r	125.4	4.6
October	137.6r	-0.8r	123.8	1.8
November	139.7r	1.8	124.4	2.5
December	140.5r	3.0r	124.5	2.5
1997				
January	141.4	3.9r	123.0	-0.2
February	143.5	5.9	125.5	3.1
March	143.5r	5.1r	126.8	4.6
April	144.1r	5.2r	125.4	2.0
May	144.3r	4.7r	125.3r	1.5r
June	144.1r	4.0r	126.3r	2.7r
July	144.8	4.4	126.8	2.9

r *- Revised*

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

Table 7.
The Contribution of Each Aluminum Mill Products Index Component to the Percent Change in the Index from the Previous Month

Leading Index	**June**	**July**
1. Average weekly hours, aluminum sheet, plate, and foil (SIC 3353)	-0.1	-0.2
2. Index of new private housing units authorized by permit	-0.1	0.0
3. Industrial production index for automotive products	0.1r	-0.4
4. Construction contracts, commercial and industrial (square feet)	-0.3	0.4
5. Net new orders for aluminum mill products (pounds)	0.2	0.1
6. Growth rate of U.S. M2 money supply, 1992$	0.0	-0.1
7. Purchasing Managers' Index	-0.2	0.4
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	-0.3r	0.3
Coincident Index		
1. Industrial production index, aluminum sheet, plate, and foil (SIC 3353)	0.5	-0.4
2. Total employee hours, aluminum sheet, plate, and foil (SIC 3353)	0.2	-0.1
3. Shipments of aluminum mill products (pounds)	-0.1r	0.9
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	0.7r	0.5

Sources: Leading: 1, Bureau of Labor Statistics; 2, Bureau of the Census and U.S. Geological Survey; 3, Federal Reserve Board; 4, F.W. Dodge, Division of McGraw-Hill Information Systems Company; 5, The Aluminum Association, Inc. and U.S. Geological Survey; 6, Federal Reserve Board, Conference Board, and U.S. Geological Survey; 7, National Association of Purchasing Management. Coincident: 1, Federal Reserve Board; 2, Bureau of Labor Statistics and U.S. Geological Survey; 3, Bureau of the Census and U.S. Geological Survey. All series are seasonally adjusted.

NA: Not Available *r - Revised*

Links To:

Chart 6.

Chart 7.

Table 8.
The Copper Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
1996				
August	118.8	1.1	112.3	0.2
September	118.9	1.0	113.8	2.7
October	119.3	1.5	115.1	4.4
November	121.1	4.0	113.3	1.0
December	120.3	2.3	114.4	2.8
1997				
January	120.2	1.8	113.6	1.1
February	122.0	4.1	114.0	1.6
March	123.7	6.3	113.7	0.7
April	121.8	2.6	114.1	1.1
May	122.4r	3.3r	114.1	0.9
June	122.9r	3.7r	114.1r	0.8r
July	121.7	1.4	113.5	-0.5

r *- Revised*

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

Table 9.
The Contribution of Each Copper Index Component to the Percent Change in the Index from the Previous Month

Leading Index	**June**	**July**
1. Average weekly overtime hours, rolling, drawing, and extruding of copper (SIC 3351)	0.2r	-0.4
2. New orders, nonferrous and other primary metals, 1982$	-0.1r	0.5
3. MII stock price index, copper companies	0.0	0.0
4. Ratio of shipments to inventories, electronic and other electrical equipment (SIC 36)	0.5r	-0.5
5. Growth rate of the LME spot price of primary copper	-0.1	-0.5
6. Index of new private housing units authorized by permit	-0.1	0.0
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	0.4	-0.9
Coincident Index		
1. Industrial production index, primary smelting and refining of copper (SIC 3331)	0.0	0.1
2. Total employee hours, rolling, drawing, and extruding of copper (SIC 3351)	0.1r	-1.7
3. Copper refiners' shipments (short tons)	-0.1	1.0
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	0.1r	-0.5

Sources: Leading: 1, Bureau of Labor Statistics; 2, Bureau of the Census and U.S. Geological Survey; 3, U.S. Geological Survey; 4, Bureau of the Census and U.S. Geological Survey; 5, London Metal Exchange and U.S. Geological Survey; 6, Bureau of the Census and U.S. Geological Survey. Coincident: 1, Federal Reserve Board; 2, Bureau of Labor Statistics; 3, American Bureau of Metal Statistics, Inc. and U.S. Geological Survey. All series are seasonally adjusted, except 3 and 5 of the leading index.

NA*: Not available* ***r*** *- Revised*

Links To:

Chart 8.

Chart 9.

Explanation

Each month, the U.S. Geological Survey tracks the effects of the business cycle on five U.S. metal industries by calculating and publishing composite indexes of leading and coincident indicators. Wesley Mitchell and Arthur Burns originated the cyclical-indicators approach for the economy as a whole at the National Bureau of Economic Research in the mid-1930's. Over subsequent decades this approach was developed and refined, mostly at the National Bureau, under the leadership of Geoffrey H. Moore.[1]

A business cycle can briefly be described as growth in the level of economic activity followed by a decline succeeded by further growth. These alternating periods of growth and decline do not occur at regular intervals. Composite indexes, however, can help determine when highs and lows in the cycle might occur. A composite index combines cyclical indicators of diverse economic activity into one index, giving decision makers and economists a single measure of how changes in the business cycle are affecting economic activity.

The indicators in the metal industry leading indexes historically give signals several months in advance of major changes in a coincident index, a measure of current metal industry activity. Indicators that make up the leading indexes are, for the most part, measures of anticipations or new commitments to various economic activities that can affect the metal industries in the months ahead.

Composite coincident indexes for the metal industries consist of indicators for production, shipments, and total employee hours worked. As such, the coincident indexes can be regarded as measures of the economic health of the metal industries.

Three of the metal industry coincident indexes, those for primary metals, steel, and aluminum mill products, reflect their classifications in the U.S. Standard Industrial Classification (SIC). The SIC is the main classification used by the United States government and industry in collecting and tabulating economic statistics. Two of the coincident indexes, one for copper and one for primary and secondary aluminum, are blends of two different copper and aluminum industries, respectively.

Of the five metal industries, primary metals is the broadest, consisting of twenty-six different metal processing industries. The steel, aluminum, and copper industries are parts of the primary metals industry.

The metal industry leading indexes turn before their respective coincident indexes an average of 9 months for primary metals, 8 months for steel, and 7 months for copper. The average lead time for the leading indexes of aluminum mill products and primary and secondary aluminum is 6 months.

[1]**Business Cycle Indicators, A monthly report from The Conference Board** (March 1996).

The leading index of metal prices, also published in the Metal Industry Indicators, is designed to signal changes in a composite index of prices for primary aluminum, copper, lead, and zinc traded on the London Metal Exchange. On average, this leading index indicates significant changes in price growth about 7 months in advance.

The growth rate used in the Metal Industry Indicators is a 6-month smoothed growth rate at a compound annual rate, calculated from a moving average. Moving averages smooth fluctuations in data over time so that trends can be observed. The 6-month smoothed growth rate is based upon the ratio of the latest monthly value to the preceding 12-month moving average.

$$\left[\left(\frac{\text{current value}}{\text{preceding 12-month moving average}}\right)^{\frac{12}{6.5}} - 1.0\right] * 100$$

Because the interval between midpoints of the current month and the preceding 12 months is 6.5 months, the ratio is raised to the 12/6.5 power to derive a compound annual rate.

The growth rates measure the near-term industry trends. They, along with other information about the metal industries and the world economy, are the main tools used to determine the outlook of the industries. A 6-month smoothed growth rate above +1.0% usually means increasing growth; a rate below -1.0% usually means declining growth.

The next summary is scheduled for release on MINES FaxBack at 10:00 a.m. EDT, Friday, October 17. Access MINES FaxBack from a touch-tone telephone attached to a fax machine by dialing 703-648-4999. The address for Metal Industry Indicators on the World Wide Web is: http://minerals.er.usgs.gov/minerals/pubs/mii/

The **Metal Industry Indicators** is produced at the U.S. Geological Survey by the Minerals Information Team. The report is prepared by Kenneth Beckman (703-648-4916), e-mail (kbeckman@usgs.gov), and Gail James (703-648-4915), e-mail (gjames@usgs.gov). The Center for International Business Cycle Research at Columbia University and the former U.S. Bureau of Mines developed the metal industry leading and coincident indexes. Customers can send mail concerning the Metal Industry Indicators to the following address:

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